

## Abstract

Coherent production of vector mesons off the deuterium using a 6 GeV electron beam and the CLAS detector at Jefferson Lab will be used to investigate hard exclusive processes.

The large acceptance offered by the CLAS detector and its capability of detecting multi-particle final states will allow a simultaneous measurement of the electroproduction of  $\rho$ ,  $\omega$ , and  $\phi$  mesons over a large kinematic range:  $1 < Q^2 < 4.5 \text{ (GeV/c)}^2$ ,  $0.1 < x < 0.5$ , and  $0.1 < -t < 1 \text{ (GeV/c)}^2$ .

The production of the  $q\bar{q}$  and its evolution into the final hadronic state will be studied in the range where the vector meson dominance describes the process to the regime where QCD degrees of freedom become important. This measurement, together with CLAS data on the vector meson electroproduction off a proton target at 6 GeV, will provide important information on the production of small size configurations of quarks and gluons in hard exclusive processes, and on the interaction of these objects with nuclear matter. The reduced interaction of small-size objects is known as the *Color Transparency* (CT) phenomenon.

This experiment will form the basis of a broad program, ultimately including polarization observables and photoproduction experiments, that will lead to investigations with the proposed CEBAF 12 GeV upgrade. For the proposed measurement we request a total of 66 days of beam time, of which 16 days will be concurrently with the approved E6 run with CLAS in the standard configuration. The remaining 50 days are new beam time at 6 GeV with a modified CLAS configuration.